

PCBs in the Delaware Estuary

Stage One TMDLs Established in 2003

A milestone in water pollution control was achieved on December 15, 2003, when the U.S. Environmental Protection Agency (EPA) established total maximum daily loads (TMDLs) for polychlorinated biphenyls (PCBs) in the Delaware River Estuary based on several years of technical work conducted by the DRBC. This action was taken on behalf of the states of New Jersey, Pennsylvania, and Delaware and is part of an ongoing program designed to protect human health from the effects of eating PCB-contaminated fish now found in the estuary.

The three states and EPA asked the DRBC in the spring of 2000 to take the lead in developing the technical basis for the TMDLs, an extraordinarily complex task that has relied on scientific investigations, data collection efforts, and water quality modeling.

“The Delaware River is the cleanest it’s been in decades,” DRBC Executive Director Carol R. Collier noted. “But the presence of PCBs remains a problem. States bordering the river have issued fish consumption advisories because of elevated PCB levels in fish tissue. The goal is to reduce the level of this toxic

substance to a point where the standards are met and the advisories are no longer necessary.”

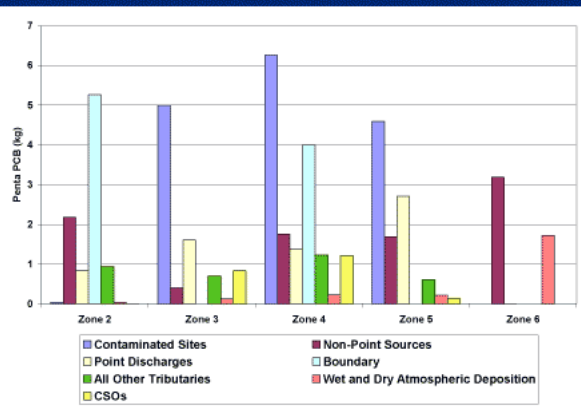
What are PCBs and TMDLs?

The EPA has classified PCBs as a probable human carcinogen. The United States banned the manufacture and general use (with a few exceptions) of PCBs in the late 1970s, but not before 1.5 billion pounds of the substance was produced. PCBs were used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don’t burn easily and are good insulators. The chemical stability of PCBs, which encouraged their use in hundreds of industrial and commercial applications, also allows them to persist in the environment. PCBs enter fish and other wildlife through absorption or ingestion, and accumulate in their tissues at levels many times higher than in the surrounding water and at levels unsuitable for human consumption.

There are numerous sources of PCBs in the Delaware Estuary. They include contaminated sites, non-point sources like stormwater runoff, industrial and municipal point source (“end-of-pipe”) discharges, the mainstem Delaware River above Trenton, N.J., tributaries to the Delaware both above and below Trenton, the atmosphere, combined sewer overflows (CSOs), and the Atlantic Ocean.

A TMDL is essentially a “pollution budget.” It sets the maximum amount of a specific pollutant that a water body can receive without violating applicable water quality standards. It then allocates that amount among all sources in the watershed – both point and non-point – which must then reduce loads to the allocated levels in order to achieve and maintain the standards.

Penta-PCB Load by Category and Zone during 577 day simulation period



“Boundary” in zone 2 refers to the Delaware River above Trenton, N.J. and in zone 4 refers to the Schuylkill River above the Fairmount Dam. “All other tributaries” excludes the Schuylkill River.

The principle sources of PCB loadings are contaminated sites and non-point sources.

The four TMDLs established in December 2003 address different water quality zones (Zones 2-5) in the 85-mile tidal reach of the Delaware River from Trenton downstream to the head of the Delaware Bay, near Liston Point, Del. The TMDLs also include tidal portions of tributaries.

Each TMDL must provide for the achievement of the applicable water quality standard within the zone and also must ensure that water quality in downstream zones is adequately protected. The TMDLs will be incorporated by Pennsylvania, New

Jersey, and Delaware into their current water quality management plans.

A staged approach to establishing the PCB TMDLs, first discussed in Spring 2002, is being used. DRBC staff developed and calibrated a water quality model for one particular type of PCB (known as “Penta-PCBs”) that represents about one-quarter of the total PCBs present in the estuary.

“The successful development of the water quality model was a collaborative effort of the DRBC staff and scientists from Limno-Tech, Inc., a consultant to the commission, and HydroQual, Inc., a consultant to a coalition of industrial and municipal point source dischargers,” noted Dr. Thomas Fikslin who headed the DRBC’s technical effort. The model, in turn, was extrapolated for total PCBs in order to develop the Stage One TMDLs in 2003. The December 2003 deadline had been established under a court-mandated schedule resulting from a lawsuit against the federal government. DRBC, EPA, and the estuary states will continue to further refine the TMDLs through more detailed monitoring to enhance the Stage One model. The Stage Two TMDLs are scheduled to be established in December 2006.

An Interstate-Federal Collaborative Effort

DRBC staff worked closely with the commission’s Toxics Advisory Committee (TAC), comprised of representatives from the states, EPA, municipal and industrial dischargers, academia, agriculture, public health, environmental organizations, and fish and wildlife interests. Assisting commission staff and the TAC was an expert panel of scientists from EPA, Rutgers University, Tufts University, University of Maryland, Mississippi State University, and Interface Inc. “Achieving the December 2003 deadline was only possible through collaborative projects with several academic institutions – such as the University of Delaware, Rutgers University, and the Chesapeake Biological Laboratory – and our state partners, particularly the Delaware Department of Natural Resources & Environmental Control,” Fikslin said.

“The reduction in PCB levels will not occur overnight and achieving the water quality standards will take decades,” Collier said. “Point source dischargers will be required to develop and implement PCB minimization plans, and non-point pollution reduction strategies will need to be crafted. Fortunately, some large dischargers along the river already are conducting studies to track



DRBC Chairman Ernest Hahn (representing N.J. Governor McGreevey) reads a certificate of appreciation for outstanding service that was presented to five commission staff members in December 2003. The technical PCB TMDL team honorees included (from left to right) Modeling and Monitoring Branch Head Tom Fikslin, Daniel Liao, Namsoo Suk, John Yagecic, and Gregory Cavallo. (Photo by Clarke Rupert)

down PCBs on a voluntary basis.”

“Developing the scientific basis and actually reducing the levels of PCBs is an extremely complex undertaking, and I am pleased to report that the overall efforts by the DRBC and its governmental partners to open up the process for greater participation by all interested stakeholders has been well-received,” Collier added.

The commission’s TAC has formed the core of stakeholder involvement in the process. The DRBC established a new TMDL Implementation Advisory Committee (IAC) in 2003, which has been asked to develop creative and cost-effective strategies for reducing loadings of PCBs. Members include the three estuary states, municipal and industrial dischargers, and fishery, wildlife, and environmental organizations.

Other stakeholder participation opportunities in 2002 and 2003 included:

- A Science Symposium held in October 2002 that was sponsored by the Delaware Estuary TMDL Coalition (which includes municipal and industrial dischargers);
- A meeting among regulators and stakeholders held in April 2003 that focused on the TMDLs and their regulatory implications;
- Three informational meetings held during September 2003 in Delaware, New Jersey, and Pennsylvania about the proposed TMDLs; and
- An October 2003 public hearing held in Philadelphia on the proposed TMDLs.

To learn more about this important water quality initiative, please visit the DRBC web site at http://www.nj.gov/drbc/toxics_info.htm.

Delaware Estuary Water Quality Zones

